Claim 1-10 (Canceled)

11. (Currently Amended) An isolated and purified tandem of P domains in a weak inward rectifying potassium channel (TWIK-1) protein constituting a potassium channel, wherein the protein comprises SEQ ID No. 2~~, or a functionally equivalent derivative of said sequence, and wherein said functionally equivalent derivative consists of two pore domains, P1 and P2, four transmembrane domains, T1 to T4, which are suitable for transporting potassium across a membrane, and wherein said P2 domain comprises a GLG sequence, a potential N-glycosylation site, which is present in the loop between the M1 and the P1 domains, and three consensus sites of phosphorylation which are present at a N-terminal, a C-terminal, and a T2-T3 linker~~.

Claims 12-26 (Canceled)

27. (Currently Amended) An isolated and purified tandem of P domains in a weak inward rectifying potassium channel (TWIK-1) protein ~~constituting a potassium channel, wherein the protein comprises~~ comprising a functionally equivalent derivative of SEQ ID NO. 2, ~~wherein said functionally equivalent derivative consists of two pore domains, four transmembrane domains, and is~~ which is suitable for transporting potassium across a membrane with weak inward rectification properties, and wherein said ~~two pore domains comprise SEQ ID No. 5 or 6~~ functionally equivalent derivative comprises two pore domains P1 and P2, wherein said P2 domain comprises a GLG sequence; four transmembrane domains M1, M2, M3 and M4; an amino acid loop between the M1 and the P1 domains containing a potential N-glycosylation; a phosphorylation consensus site at the N-terminus; a phosphorylation consensus site at the C-terminus; and a phosphorylation consensus site between the M2 and M3 domains.

28. (New) The isolated and purified TWIK-1 protein of claim 27, wherein P1 comprises SEQ ID No. 5 and P2 comprises SEQ ID No. 6.